

Magnetolithologic and magnetomineralogical characteristics of sediments at the Mesozoic/Cenozoic boundary: The Koshak section (Mangyshlak peninsula)

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Abstract

Results of a detailed petromagnetic study of sediments of the Koshak section, including the Mesozoic/Cenozoic (K/T) boundary, are presented. The rocks are shown to have a very low magnetization. A relatively high magnetization is characteristic of two thin clayey beds, one at the K/T boundary and the other 0.6 m above it: χ up to 2.5×10^9 m³/kg, M_s up to 0.6×10^3 A m²/kg, and M_{rs} up to 0.4×10^3 A m²/kg. This is related to relatively high concentrations of hemoilmenite (up to 0.2%), magnetite (up to 0.01%), and goethite (up to 0.24%) in these beds. It is evident that the distribution of these magnetic minerals is lithologically controlled (the predominant occurrence in clayey beds), which is expressed, in particular, in the relation between the paramagnetic (clayey) and diamagnetic (carbonate) contributions to the magnetization of the sediments. Thus, clayey interbeds are sharply distinguished by the value of the paramagnetic magnetization ($M_p = (83-86) \times 10^5$ A m²/kg) as compared with purely diamagnetic chalk $M_d = -(26-35) \times 10^5$ A m²/kg). Minor concentrations of metallic iron (up to ~0.002%) discovered in the sediments have a lithologically uncontrolled distribution (metallic iron is more often observed near the K/T boundary rather than in clayey beds). Most probably, magnetite, hemoilmenite, and goethite were accumulated mostly with clay and other terrigenous material, while fine particles of iron are likely to have been dispersed by air. The whole set of the data of this work suggests that the K/T boundary is not distinguished by characteristic magnetomineralogical and magnetolithologic features. © Pleiades Publishing, Inc. 2006.

<http://dx.doi.org/10.1134/S1069351306110097>
